NIH Toolbox

Technical Manual

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NIH Toolbox Technical Manual

Domain:

EMOTION

Subdomain:

PSYCHOLOGICAL WELL-BEING

Subdomain Component:

MEANING AND PURPOSE

Measure:

<u>NIH Toolbox Meaning and Purpose Survey</u>

The NIH Toolbox Meaning and Purpose Survey is comprised of items taken with permission from these sources:

Items PA050-PA054 from Meaning in Life Questionnaire, (Steger, M.F., Frazier, P., Oishi, S., & Kaler, M. (2006). The Meaning in Life Questionnaire: Assessing the Presence of and Search for Meaning in Life. *Journal of Counseling Psychology, 53*(1), 80-93.)

Items PA060-PA065 from Life Engagement Test, (Scheier, M., Wrosch, C., Baum, A., Cohen, S., Martire, L., Matthews, K., . . . Zdaniuk, B. (2006). The Life Engagement Test: Assessing Purpose in Life. *Journal of Behavioral Medicine, 29*(3), 291-298.)

Items PA 073 – PA076 from FACIT-Sp, (Peterman, A.H., Fitchett, G., Brady, M.J., Hernandez, L., & Cella, D. (2002). Measuring Spiritual Well-Being in People with Cancer: The Functional Assessment of Chronic Illness Therapy--Spiritual Well-Being Scale (FACIT-Sp). A*nnals of Behavioral Medicine, 24*(1), 49-58.)

Item PA057 from European Social Survey European Social Survey, (2012). ESS Round 6 Source Questionnaire. London: Centre for Comparative Social Surveys, City University London.

Item PA058 from Benefit Finding Scale, (Tomich, P. L., & Helgeson, V. S. (2004). Is finding something good in the bad always good? Benefit finding among women with breast cancer. *Health Psychology, 23*, 16-23.)

Item PA059 from Mental Health Inventory (MHI), (Veit, C.T., & Ware, J.E., Jr. (1983). The Structure of Psychological Distress and Well-Being in General Populations. *Journal of Consulting and Clinical Psychology, 51*(5), 730-742.

Expert Contributors-EMOTION

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This Technical Manual contains the following informational sections:

Section 1:   **Introduction to NIH Toolbox**

Section 2:   **Validation**

Section 3:   **Norming**

Section 4:   **NIH Toolbox and the National Children's Study (NCS)**

Section 5:   **Domain Definition**

Section 6:   **Subdomain and Subdomain Component Definitions**

Section 7:   **Measure Description**

Section 8:   **Post-Validation/Post-Norming Changes to the Measure**

Section 9:   **The Measure's Scoring Model**

Section 10:   **Measure Norms**

Section 1:   Introduction to NIH Toolbox

NIH Toolbox is a multidimensional set of brief measures assessing cognitive, emotional, motor, and sensory function from ages 3-85. This suite of on-line and royalty-free measures can be administered to study participants 3 to 85 years of age in two hours or less, across diverse study designs and settings.

What is the NIH Toolbox?

The NIH Toolbox provides a standard set of royalty-free, brief, and comprehensive assessment tools that can be used by researchers and clinicians in a variety of settings, with a particular emphasis on measuring outcomes in longitudinal epidemiologic studies and prevention or intervention trials across the lifespan (ages 3-85). The battery ensures that assessment methods and results can be used for comparisons across existing and future studies and provides a "common currency" for the study of neurological research that promotes economies of scale and enhanced efficiency in measurement. The NIH Toolbox can be used to monitor neurological and behavioral function over time and measure key constructs across developmental stages. This facilitates the study of functional changes across the lifespan, including evaluating intervention and treatment effectiveness.

The NIH Toolbox Batteries

The basic NIH Toolbox can be administered within two hours and divides tests into four domain batteries: Cognition, Emotion, Motor, and Sensation. In addition, within some domains, there are supplemental measures that are available to be administered.

Selection of the NIH Toolbox Domains and Subdomains

Four domains were selected for the NIH Toolbox: Cognition, Emotion, Motor, and Sensation. Subdomain selection was based upon literature reviews, expert interviews, and multiple formal Requests for Information (RFI) of NIH-funded researchers. Initial literature and database reviews and an RFI identified the subdomains for inclusion in the NIH Toolbox, existing measures relevant to the project goals, and criteria for instrument selection. NIH Project Team members, external content experts, and contract scientists met at a follow-up consensus meeting to discuss potential subdomains along with the criteria affecting instrument selection, creation, and norming. Additional expert interviews were undertaken to gather more detailed information from clinical and scientific experts to help further refine the list of possible subdomains. A second consensus group meeting was held and results directed the decision for the final NIH Toolbox to assess four core domain areas (cognitive, emotional, motor, and sensory health and function).

Selection of Measures for the NIH Toolbox

More than 1,400 existing measures were identified and evaluated for potential inclusion in the NIH Toolbox. The selection criteria included a measure's applicability across the life span,

psychometric soundness, brevity, ease of use, applicability in diverse settings and with different

groups, and lack of intellectual property constraints. There was also a preference for

instruments that were already validated and normed for use with individuals between 3 and 85

years old. Results of the instrument selection process yielded draft development plans

established for the NIH Toolbox measures.

Early Childhood Use

NIH Toolbox measure development focused special attention on assessing young children, to

ensure that all tests given are developmentally appropriate for ages 3-7. A special team of early

childhood assessment consultants was engaged to provide testing guidelines for the very

young, to offer input on measure development, and to review all NIH Toolbox measures to

ensure they fit the needs of young children. Advanced statistical methods were used to

emphasize continuity of measurement, allowing Toolbox users to confidently conduct

longitudinal measurement from age 3 through the life span while assessing the same domain

constructs.

Section 2:   Validation

Validation studies were conducted for all NIH Toolbox Emotion domain measures, to assure

that these important tools for research met rigorous psychometric standards. Studies were

conducted across the entire age range and were statistically compared against "gold standard" measures wherever available.

For specifics regarding Emotion domain measure validation, see Salsman et al., Emotion Assessment using the NIH Toolbox, *Neurology*, in press. This manuscript describes measure development studies undertaken (e.g., expert panels for content development and validation; cognitive interviews; small and large-scale pilot testing) and psychometric characteristics (e.g., internal consistency and test-retest reliability; convergent and divergent validity).

Section 3:   Norming

NIH Toolbox conducted a large national standardization study in both English and Spanish languages to allow for normative comparisons on each assessment. A sample of 4,859 participants, ages 3-85 – representative of the U.S. population based on gender, ethnicity, race, and socioeconomic status – was administered all of the NIH Toolbox measures at sites around the country (n = 2,917 English-speaking children, ages 3-17; n = 496 Spanish-speaking children, ages 3-7; n = 1,038 English-speaking adults, ages 18-85; n = 408 Spanish-speaking adults, ages 18-85). NIH Toolbox normative scores are now available for each year of age from 3 through 17, as well as for age ranges 18-29, 30-39, 40-49, 50-59, 60-69, and 70-85, allowing for targeted and accurate comparisons to the U.S. population.

Specifics regarding NIH Toolbox norming sampling methods (e.g., stratification by age, gender, and language preference; sampling a minimum of 25-100 individuals per targeted demographic and language subgroup) and norming analytic methods (e.g., post-stratification adjustment using iterative proportional fitting, i.e., "raking") can be found in the following publication: Beaumont et al., Norming Plans for the NIH Toolbox, *Neurology*, in press.

Section 4: NIH Toolbox and the National Children's Study (NCS)

In collaboration with NIH Toolbox scientists, NCS investigators selected measures from PROMIS and NIH Toolbox for a Maternal Health Profile, the Maternal Self-Reported Health Battery. This profile assesses Physical Health (Physical function, Fatigue, Sleep disturbance, Sleep-related impairment), Mental Health (Anger, Anxiety, Depression, Positive affect, Perceived stress, Self-efficacy), and Social Health (Social support and companionship, Social isolation). The Maternal Self-Reported Health Battery was field tested in fall 2011, using an online sample of 1000 women (200 pre-conception, 150 pregnant women (50 per trimester), and 650 mothers with a child between 0-36 months of age). In addition, NIH Toolbox norming was jointly sponsored by the NCS and included: 3,413 children in single-year age bands (from 3-17 years); 1,446 adults in seven age bands, including the mothers of children also being tested; and 105 pregnant women. The NIH Toolbox sampling plan matched distributions of race/ethnicity and level of education for each age band.

Section 5:   Domain Definition

Domain: EMOTION

Emotion refers to any strong feelings, as of joy, sorrow, or fear. Emotion is an affective state of consciousness in which joy, sorrow, fear, hate, or the like, is experienced, as distinguished from cognitive and volitional states of consciousness. Emotions can be negative and distressing, or positive emotions can be reflections of well-being in our lives, and positive social relationships can buffer stress and enhance health. The NIH Toolbox Emotion domain includes four major subdomains: Psychological Well-Being, Negative Affect, Stress and Self-Efficacy, and Social Relationships. Measures include both self-report and, for certain ages, parent-report versions.

PSYCHOLOGICAL WELL-BEING

POSITIVE AFFECT

Measured by:

NIH Toolbox Positive Affect Survey

LIFE SATISFACTION

Measured by:

NIH Toolbox General Life Satisfaction Survey

NIH Toolbox Domain-Specific Life Satisfaction Survey (Supplemental Measure)

MEANING AND PURPOSE

Measured by:

NIH Toolbox Meaning and Purpose Survey

NEGATIVE AFFECT

ANGER

Measured by:

NIH Toolbox Anger-Affect Survey

NIH Toolbox Anger-Hostility Survey

NIH Toolbox Anger-Physical Aggression Survey

NIH Toolbox Anger Survey

FEAR

Measured by:

NIH Toolbox Fear-Affect Survey

NIH Toolbox Fear-Somatic Arousal Survey

NIH Toolbox Fear-Over Anxious Survey

NIH Toolbox Fear Survey

NIH Toolbox Fear-Separation Anxiety Survey

SADNESS

Measured by:

NIH Toolbox Sadness Survey

NIH Toolbox Apathy Survey (Supplemental Measure)

STRESS AND SELF-EFFICACY

PERCEIVED STRESS

Measured by:

NIH Toolbox Perceived Stress Survey

SELF-EFFICACY

Measured by:

NIH Toolbox Self-Efficacy Survey

COPING STRATEGIES

Measured by:

NIH Toolbox Emotion Control Survey (Supplemental Measure)

SOCIAL RELATIONSHIPS

PERCEIVED SOCIAL SUPPORT

Measured by:

NIH Toolbox Emotional Support Survey

NIH Toolbox Instrumental Support Survey

NIH Toolbox Maternal Relationship Survey (Supplemental Measure)

NIH Toolbox Paternal Relationship Survey (Supplemental Measure)

NIH Toolbox Positive Parental Relationship Survey (Supplemental

Measure)

NIH Toolbox Negative Parental Relationship Survey (Supplemental

Measure)

COMPANIONSHIP

Measured by:

NIH Toolbox Friendship Survey

NIH Toolbox Loneliness Survey

NIH Toolbox Social Withdrawal Survey

NIH Toolbox Positive Peer Interaction Survey

SOCIAL DISTRESS

Measured by:

NIH Toolbox Perceived Rejection Survey

NIH Toolbox Perceived Hostility Survey

NIH Toolbox Peer Rejection Survey

NIH Toolbox Sibling Rejection Survey (Supplemental Measure)

POSITIVE SOCIAL DEVELOPMENT

Measured by:

NIH Toolbox Empathic Behaviors Survey

EMOTION Batteries

There are two NIH Toolbox Emotion Batteries – a self-report battery and a parent-report battery. The self-report battery is available for ages 8-85 and includes all age-specified measures in the Psychological Well-Being, Negative Affect, Stress and Self-Efficacy, and Social Relationships domains, as indicated. The parent-report battery is available for ages 3-12 and includes all age-specified measures in the Psychological Well-Being, Negative Affect, Stress and Self-Efficacy, and Social Relationships domains, as indicated. There are individual scores provided for each individual battery measure, as described, but no composite scores.

Section 6: Subdomain and Subdomain Component Definitions

Subdomain: **PSYCHOLOGICAL WELL-BEING**

Psychological Well-Being includes both hedonic and eudaimonic aspects of well-being. Hedonic aspects are more subjective and experiential and emphasize pleasure and positive affect (happiness, serenity, cognitive engagement). Eudaimonic well-being is more evaluative in nature and emphasizes fulfillment and purpose (e.g., meaning, life satisfaction). NIH Toolbox

includes measures for three components of psychological well-being: Positive Affect, Life

Satisfaction, and Meaning and Purpose.

Subdomain Component: MEANING AND PURPOSE

Meaning and Purpose is characterized by the extent to which people feel their life matters or

makes sense. In NIH Toolbox, Meaning and Purpose is measured by:

NIH Toolbox Meaning and Purpose Survey

Section 7:   Measure Description

EMOTION Core Measure

The NIH Toolbox Meaning and Purpose Survey is a self-report measure that is administered only

to ages 18-85, as a computer-adaptive test. In addition, a fixed-length self-report form is

available for ages 18-85, as a *supplemental measure*.

Section 8: Post-Validation/Post-Norming Changes to the Measure

No notable Post-Validation/Post-Norming changes were made to the measure subsequent to those changes previously reported on during the measure's development and validation phases (Salsman et al., Emotion Assessment using the NIH Toolbox, *Neurology*, in press).

Section 9: The Measure's Scoring Model

Measurement theory applied for scoring:

Rasch/Item Response Theory (IRT)

Rasch/IRT model employed:

Graded Response Model

Measure length:

Variable (computer-adaptive test, 18-85 Self Report)

Fixed (18-85 Self Report as a supplemental measure)

Response data:

Ordinal (items have a 5-point response scale; options range from "strongly disagree" to "strongly agree," or from "not at all" to "very much")

Scores computed/available*:

Rasch/IRT Theta Score

Age-Adjusted Scale Score (mean=50, standard deviation=10)

Fully Adjusted Scale Score (mean=50, standard deviation=10)

Unadjusted Scale Score (mean=50, standard deviation=10)

National Percentile Rank (corresponds to the Age-Adjusted Scale Score)

*Details on these scores and their interpretations are available in the NIH Toolbox Scoring and Interpretation Guide.

Section 10:   Measure Norms

The following Tables and Figure present NIH Toolbox normative data associated with this measure:

Table 1.   **Measure Raw/Computed Score, Unadjusted Scale Score, and Fully Adjusted Scale Score Summary (N, Mean, Standard Deviation) by Age Group (18-29, 30-39, 40-49, 50-59, 60-69, 70-85, All)**

Table 2.   **Measure Raw/Computed Score Statistics (N, Mean, Standard Deviation, Minimum/Maximum Observed, 25th/50th/75th Percentile) per Age Group (18-29, 30-39, 40-49, 50-59, 60-69, 70-85, All)**

Figure 1.   **Measure Mean Unadjusted Scale Scores across All Age Groups (18-29, 30-39, 40-49, 50-59, 60-69, 70-85)**

Table 1. NIH Toolbox Meaning and Purpose 18-85 by Age Group	Meaning and Purpose (theta)			Meaning and Purpose 18-85 Unadjusted Scale Score			Meaning and Purpose 18-85 Fully Adjusted Scale Score		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Age Group									
3	0			0			0		
4	0			0			0		
5	0			0			0		
6	0			0			0		
7	0			0			0		
8	0			0			0		
9	0			0			0		
10	0			0			0		
11	0			0			0		
12	0			0			0		
13	0			0			0		
14	0			0			0		
15	0			0			0		
16	0			0			0		
17	0			0			0		
18 - 29	212	0.23	1.86	212	51.46	18.46	206	49.47	18.04
30 - 39	239	0.14	1.46	239	50.65	14.88	228	49.73	15.06
40 - 49	202	0.09	1.69	202	50.01	17.42	190	50.00	17.74
50 - 59	154	0.05	1.82	154	49.54	18.82	139	49.87	19.46
60 - 69	135	0.02	1.66	135	48.99	16.86	124	49.72	17.39
70 - 85	215	-0.09	1.07	215	47.98	11.12	191	50.22	11.41
All	1157	0.10	1.60	1157	50.02	16.32	1078	49.80	16.47

Table 2. NIH Toolbox Meaning and Purpose (theta) – Age 18-29		English			Spanish			Total		
		Males	Females	Total	Males	Females	Total	Males	Females	All
	N	50	98	148	18	46	64	68	144	212
	Mean	0.32	0.19	0.25	-0.01	0.20	0.12	0.28	0.19	0.23
	Standard Deviation	2.28	2.09	2.15	1.23	0.70	0.88	2.06	1.77	1.86
	Minimum Observed	-1.48	-3.36	-3.36	-1.26	-1.27	-1.27	-1.48	-3.36	-3.36
	25th Percentile	-0.23	-0.33	-0.30	-0.55	-0.14	-0.30	-0.24	-0.32	-0.30
	50th Percentile (Median)	0.20	0.06	0.06	-0.06	0.06	-0.04	-0.06	0.06	0.03
	75th Percentile	1.10	0.83	1.08	0.20	0.49	0.44	1.10	0.79	0.97
	Maximum Observed	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94

Table 2. NIH Toolbox Meaning and Purpose (theta) – Age 30-39		English			Spanish			Total		
		Males	Females	Total	Males	Females	Total	Males	Females	All
	N	43	134	177	18	44	62	61	178	239
	Mean	-0.08	0.24	0.14	0.29	0.10	0.17	-0.04	0.23	0.14
	Standard Deviation	1.53	1.60	1.60	1.29	0.80	0.96	1.47	1.44	1.46
	Minimum Observed	-2.20	-1.98	-2.20	-3.27	-3.35	-3.35	-3.27	-3.35	-3.35
	25th Percentile	-0.46	-0.32	-0.43	-0.06	-0.44	-0.32	-0.46	-0.32	-0.43
	50th Percentile (Median)	-0.06	0.20	0.01	0.31	0.08	0.20	-0.06	0.20	0.06
	75th Percentile	0.20	0.95	0.65	0.93	0.63	0.79	0.31	0.88	0.65
	Maximum Observed	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94

Table 2. NIH Toolbox Meaning and Purpose (theta) – Age 40-49		English			Spanish			Total		
		Males	Females	Total	Males	Females	Total	Males	Females	All
	N	55	102	157	20	25	45	75	127	202
	Mean	0.02	0.13	0.09	0.19	0.06	0.13	0.04	0.13	0.09
	Standard Deviation	1.99	1.78	1.85	0.99	0.88	0.92	1.78	1.64	1.69
	Minimum Observed	-3.59	-2.28	-3.59	-1.42	-2.23	-2.23	-3.59	-2.28	-3.59
	25th Percentile	-0.57	-0.63	-0.57	-0.06	-0.46	-0.29	-0.57	-0.63	-0.57
	50th Percentile (Median)	-0.08	0.17	-0.04	-0.06	0.20	-0.06	-0.06	0.17	-0.04
	75th Percentile	0.46	0.77	0.58	0.57	0.79	0.76	0.46	0.77	0.60
	Maximum Observed	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94

Table 2. NIH Toolbox Meaning and Purpose (theta) – Age 50-59		English			Spanish			Total		
		Males	Females	Total	Males	Females	Total	Males	Females	All
	N	49	67	116	19	19	38	68	86	154
	Mean	0.07	0.04	0.06	0.07	-0.30	-0.07	0.07	0.02	0.05
	Standard Deviation	2.20	1.72	1.93	1.87	0.83	1.44	2.10	1.57	1.82
	Minimum Observed	-2.10	-2.28	-2.28	-3.59	-2.28	-3.59	-3.59	-2.28	-3.59
	25th Percentile	-0.43	-0.57	-0.44	-0.75	-0.62	-0.75	-0.44	-0.57	-0.46
	50th Percentile (Median)	-0.02	-0.06	-0.06	0.08	-0.25	-0.06	-0.02	-0.06	-0.06
	75th Percentile	0.49	0.47	0.47	1.02	-0.06	0.61	0.49	0.31	0.47
	Maximum Observed	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94

Table 2. NIH Toolbox Meaning and Purpose (theta) – Age 60-69		English			Spanish			Total		
		Males	Females	Total	Males	Females	Total	Males	Females	All
	N	39	58	97	18	20	38	57	78	135
	Mean	0.14	-0.13	0.01	0.24	-0.05	0.12	0.15	-0.13	0.02
	Standard Deviation	1.88	1.79	1.84	1.05	1.19	1.12	1.65	1.65	1.66
	Minimum Observed	-1.98	-2.66	-2.66	-1.08	-3.59	-3.59	-1.98	-3.59	-3.59
	25th Percentile	-0.33	-0.71	-0.44	-0.32	-0.42	-0.33	-0.33	-0.71	-0.44
	50th Percentile (Median)	-0.06	-0.19	-0.18	-0.06	0.07	-0.06	-0.06	-0.19	-0.08
	75th Percentile	0.63	0.06	0.33	0.97	0.57	0.85	0.63	0.07	0.49
	Maximum Observed	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94

Table 2. NIH Toolbox Meaning and Purpose (theta) – Age 70-85		English			Spanish			Total		
		Males	Females	Total	Males	Females	Total	Males	Females	All
	N	88	96	184	18	13	31	106	109	215
	Mean	-0.08	-0.13	-0.10	0.13	0.26	0.17	-0.07	-0.11	-0.09
	Standard Deviation	1.21	1.08	1.14	0.46	0.43	0.44	1.12	1.03	1.07
	Minimum Observed	-2.09	-3.59	-3.59	-0.90	-0.58	-0.90	-2.09	-3.59	-3.59
	25th Percentile	-0.56	-0.55	-0.55	-0.09	-0.29	-0.20	-0.56	-0.47	-0.55
	50th Percentile (Median)	-0.19	-0.19	-0.19	-0.06	-0.04	-0.06	-0.12	-0.19	-0.19
	75th Percentile	0.20	0.06	0.20	0.20	0.79	0.60	0.20	0.06	0.20
	Maximum Observed	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94

Table 2. NIH Toolbox Meaning and Purpose (theta) – NCS Sample of Mothers		English	Spanish	All
	N	72	29	101
	Mean	0.16	0.01	0.12
	Standard Deviation	0.93	1.14	0.99
	Minimum Observed	-2.28	-3.35	-3.35
	25th Percentile	-0.38	-0.32	-0.32
	50th Percentile (Median)	0.13	-0.06	0.07
	75th Percentile	0.79	0.79	0.79
	Maximum Observed	1.94	1.94	1.94

Table 2. NIH Toolbox Meaning and Purpose (theta) – NCS Sample of Pregnant Women		English	Spanish	All
	N	74	29	103
	Mean	0.25	0.26	0.25
	Standard Deviation	1.09	0.54	0.96
	Minimum Observed	-3.36	-0.55	-3.36
	25th Percentile	-0.29	-0.06	-0.22
	50th Percentile (Median)	0.13	0.06	0.07
	75th Percentile	1.10	0.57	0.93
	Maximum Observed	1.94	1.94	1.94

Figure 1
Least Squares Means

Mean Unadjusted Scale Score
With 95% Confidence Limits